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KNOTTING MATTERS

The Magazine of the International Guild of Knot Tyers

INTERNATIONAL GUILD OF KNOT TYERS

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KNOTTING MATTERS

THE MAGAZINE OF THE
INTERNATIONAL GUILD OF KNOT TYERS

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The editors welcome the submission of letters, articles, photographs and sketches for publication. Correspondence may be by e-mail **knottingmatters@igkt.net** but more extensive items, such as articles for publication, as well as any pictures, which should be of good quality, need to be sent as attachments. All submissions must include their author's name and e-mail or postal address.

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KNOTTING MATTERS

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PLEASE NOTE: LETTERS & ARTICLES FOR THE DECEMBER 2021 *KNOTTING MATTERS* MUST BE RECEIVED BY NOVEMBER 8th 2021

FRONT COVER: Toggle Rope see p42

EDITORIAL

Greetings to all, here's hoping that, wherever you are, you continue to learn how to live with Covid!

For the first time since we took on our editorial responsibilities, *KM* was full before we started putting it together! This is partly down to an extended piece on the background to Geoffrey Budworth's new book on trambling written by Pieter van de Griend (pp 22-29), and also to an extended exploration of developing flat knots carried out by a new member Manny Sardina from Gibraltar (pp 34-38). Furthermore, on reading the article on Neolithic Fish-nets (pp 14-15), we were introduced to a new way of describing rope manipulation used by the International String Figure Association (pp 16-18) that we also needed to include in order to make the fish-net article comprehensible. Could it be of interest to members? Might it be of use in the Trambling discussion? We would be interested to hear your opinions.

Please note two pieces from the Guild Secretary, the first asking for volunteers who would be prepared to help him answer, in the name of the Guild, the questions he receives (p 8). The other, on the enclosed sheet, is the reworked rules and conditions regarding the Hart Bursary. The Trustees decided that as the Guild describes itself as 'International' the bursary should be available to anyone who is working to better our understanding of knots and knotting.

The Publications Group is also calling on our help (pp 44-45) before reprinting Charlie's Knots. Don't presume that others will respond. Please get back to them via *KM*!

Our thanks, of course, to the stalwarts who continue to provide valuable copy!

You may notice a reference to the IGKT Facebook page (p 34). We know that many members do not use Facebook and also that many who appear on the IGKT Facebook page are not members. Is there a role for IGKT members who do use the Facebook page to point out where there might be, even should be, synergy?

As we struggle, at times, to fill the magazine or produce the pullouts, we are appealing to Branch Secretaries, Scout, Guide and youth leaders to poll their members in order to provide us with ideas and feedback regarding content.

We have just heard that Ken Yalden has had another health setback. Best wishes Ken.

Everyone - stay safe!

Maurice McPartlan

LETTERS TO THE EDITOR

Dear Maurice,

I am a fairly recent member of the Guild and look forward to receiving the *Knotting Matters* magazine.

The amount and scope of knot work around the world interests me, especially rope and knot work from a practical perspective or originally meant for practical applications.

Being a seafarer, it is fascinating that most things have roots in practical use, whereas now they may only be decorative, having been superseded by factory-made alternatives.

Knotting and rope work is a hobby of mine and I always find it very engaging and enjoyable. I have made a few bell ropes on recent voyages and here are some of my efforts as well as miscellaneous bits and bobs.

Liam Doran New Zealand
Liamdrn961@gmail.com

Dear Maurice,

I recently made this small, portable project bag, based on a traditional Japanese design, with a knotting component in its drawstring. The bag is made of pieces cut from old shirts, triple-layered for strength, and then quilted. It closes with a 4-strand sennet in two colours, the ends being finished with wooden beads, Matthew Walker knots and whippings, all in the same 1.5 mm cord. It currently has a part-knitted sock inside.

And why do I call it "the earthquake bag"? Some years ago, I read an article about a Mexican earthquake, which terrifyingly left survivors trapped under fallen rubble. One of these was an elderly woman who had her crochet work with her and got through the time until rescue by continuing her handiwork in the dark. Nothing better exemplifies the importance of having a small project on the go to occupy your hands and brain in unforeseen circumstances.

Jackie Hopson

Dear Maurice

I have been keen member of IGKT for many years and, although a practical user of knots in everyday life, I nevertheless failed to realise how useful knotting could be in new situations. Having recently been laid low with an awkward leg injury I was forced to reconsider some of the basics!

Tony Lee

Editors' Note: Hope you are now well enough to do away with the rigging!

Dear Maurice,

Very impressed with Mr Pepper's in-depth peek behind the curtains at large animal veterinary practice. Talk about ungrateful, all those ailing creatures you're trying to fix, and all they want to do is squash, bite, butt, or kick you into next week or the next world given half a chance.

Yelling 'It's for your own good' in its ear probably doesn't get through. Mind

you, that doesn't really work in the human field either, ask a dentist.

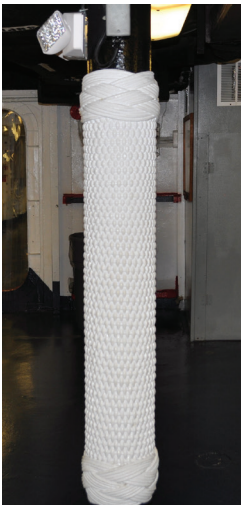
I've decided that, given any sort of choice, I'm not sure I want to come back as a horse, or even a vet for that matter.

'Nature is red in tooth and claw', as they say, even in the vet's it would appear. Try cleaning your cat's (or dog's) teeth and tell me how you get on. As far as vets go, it's a case of 'Rope is a man's best friend'.

N King.

Dear Maurice,

I hope these are of interest. I saw them on the *Lexington*, the WWII carrier on display at Corpus Christi, Texas harbour. Far right is a vertical pipe about 10in in diameter.



The woven portion ends in Turks Heads top and bottom. It has been painted repeatedly.

Hitching and Turks Heads on a bulkhead door wheel (near right), showing many coats of paint.

Peter LeQuire

Dear Maurice:

The little knot on the right seems to have become my latest *noeud du jour*. It is a Thumb Bowline and may be found in Graumont and Hensel (G&H 76/143) - not, however, in the section on bowlines! The completed knot is shown in 143-B.

Illustration 143-A is, however, faked. When the loop is taken back under the upper parts of the Thumb knot, both sides of the loop are in front of the standing parts. In the illustration, the left side is in front and the right side is behind; an impossibility unless tied differently.

It is an elegantly simple knot and very secure. It may also be tied in four different ways - two in the bight and two in the end (one with one end and one with both ends).

This picture demonstrates the second method of tying in the bight. Make a Ring hitch in a doubled end, then take the hitch back over the standing parts, then take the upper bight round the back of the standing parts and through the front of the opening. With practice, I found that this may be accomplished in five seconds (less, on a good day).

"It looks like magic!" exclaimed my wife, when given a demonstration.

"It is" I replied modestly, "Nine hundred years ago, I would have been put to death for that performance!"

I was inspired to find another knot which would lend itself to the tying description which is given in G&H. The most obvious candidate is the Figure-eight knot, which is shown on the right. In this case, the loop must be led up the rear of the Figure-eight knot, before being given the Bowline-on-the-Bight treatment, then pulled down through the knot to its present position.

Regards,

John Heselton

Dear Maurice,

I thought some fellow members might be interested in pictures of a bird which goes by the rather euphonic name, the Knot (*Calidris canutus islandica).* Herewith a shot of the large roosting Knot colony (estimated to be 140,000-strong this year) wintering on The Wash. The images were taken by wildlife photographer Les Bunyan (https://www.lesbunyanphotography.co.uk/) and he has kindly allowed us to print this image. I wrote to him following an article on the BBC's news page https://www.bbc.co.uk/news/uk-england-norfolk-54592215 and asked if we might use it.

His immediate reply was "You get the prize for the most unusual group to ask for a photo so, of course, feel free to use what you like, just credit me and possibly my website". So I promised a copy of *KM*.

Many thanks for *KM* 151 which has been happily perused in the last few days.

Colin Byfleet

Knot in winter plumage
RSPB drawing

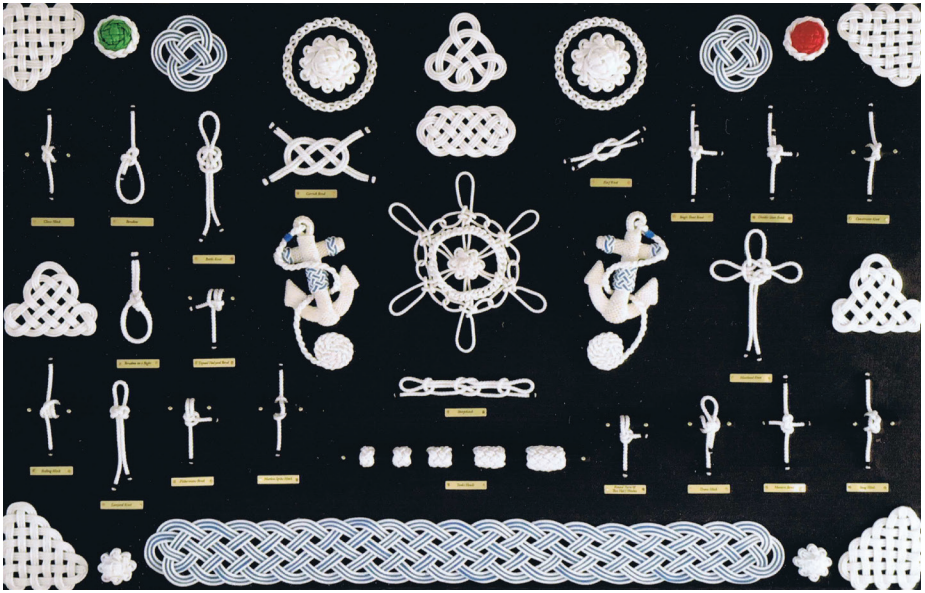
Dear Maurice

Please find the attached photo from my recent Knot Board constructed during the lockdown for Covid-19 last year in New Zealand.

A new Yacht Club has been built in Picton for the junior sailors and I felt the need to inspire them to learn the basic knots, bends and hitches. The club opened in November 2020 and they were very appreciative of the completed knot board which I framed.

I always look forward to *Knotting Matters* and the committee does a great job with the publication.

Forrest McDougall
New Zealand



Dear Maurice,

The Carrick bend, Navy speak for 'No Entry', on the gang plank of an ex-Admiralty water carrier. Note, top left, the builder's blue. Have I been wasting my breath? It looks like it. It will be sorted!

Faces in the background have been obscured to protect the guilty. In days gone by, they would have been chained to an oar for this.

The Marina Monitor.

Help Please!

As Guild Secretary, I get a steady stream of requests from non-members and organisations via email. They range from queries as to whether they have invented a new knot, how to tie a knot, or where to buy a specific type of cord, to requests from law-enforcement officers investigating cases, speakers for a meeting, practical help with a project, the list goes on and on. Most, but by no means all, of them come from the UK and the US..

I know that we have a wealth of expertise amongst our members and one of my jobs is to find someone, if I can, to answer these queries. I have a small group of people that I approach fairly regularly for such help, but often have to search via contacts to solve the puzzle. My life would be much easier, and the reputation of the Guild would be much improved, if we had a database of people who would be willing to be approached by the Secretary with queries, and invited to respond. There would be no compulsion to agree, if asked, but at least I would have a better chance of finding a willing helper who would share their specific knowledge.

So, if you are willing to join such a band of people and help the Guild and its status as a reservoir of knowledge, please will you email me at secretary@igkt.net giving me your contact details (your email will suffice if that suits you) and the area(s) of expertise in which you feel confident. I will then maintain a database which I can use to help answer the questions that come our way. Thank you. David Bodger

Knot a Problem?

by B F Stringfellow

Whenever I am confronted with a physical problem I have developed the habit of saying "Can this be solved with string?" Many times, of course, it needs something a bit more robust or a totally different approach, but it has proved to be a useful starting point. Thanks to my decades-long association with IGKT and the resulting increase in knot knowledge, I have a 'tool kit' of bends, hitches and loops, a good-sized collection of knotting books, every issue of *KM* and bags of string. Here then are a few examples of problem-solving with a piece of string and the right knot.

1 Every air traveller with suitcases will be familiar with the minor trauma of the luggage carousel. One stands at the edge of the beast and scans the passing parade of luggage, 50% of which are clones. A variety of methods identifying one's chattels are used including strips of insulating tape, ribbons and coloured tags. Sometimes some of these are somehow removed in transit and it requires frantic activity to locate one's property. My solution was to use string. I tied Turks Heads round the handle(s) with some brightly coloured string like brick layer's twine. I have never encountered any similarly tagged suitcase, the TH is very secure and the chances of another knotter using the same colours are pretty remote.

2 Another travelling tale. The need to wash and dry one's essentials is well-known by all who have gone on extensive tours. Some hotels have laundries, many have clothes lines in the bathroom just to cater for this need. A few have nothing. In one city we were residing in a 3-star hotel which was one of them. We had the need to clean but how to dry? One of the items I carry is a spool of dental floss, following a tip from a seasoned traveller friend precisely for this situation.

The material is surprisingly strong and a spool is small and light. A reconnaissance revealed two anchor points suitably positioned and far enough apart for our laundry.

One anchor point was the frame holding the TV, The other was a door handle for the connecting door into the next room.

Unfortunately this was a curved lever handle pointing the wrong way. The answer to the problem was the Icicle hitch. In minutes, a metre-and-a-half line was rigged and the damp socks and jocks suspended.

3 I am frequently asked to show how to tie /use a Trucky's hitch.
It is a useful device but I try to avoid its use if possible as I have an aversion to rope running over rope. However, on one memorable occasion I did use it when it seemed to be the best answer to my problem. I was thinning down a multi-branched shrub using a bush (bow) saw. This is a very effective tool but requires space in which to use it. One of the branches needed to be removed, but another that was to be left in situ was obstructing passage of the saw. The answer was to use the Trucky's hitch anchored to a nearby tree. I used a length of nylon cord that had reached its use-by date and successfully hauled the obstruction out of the way. The amputation was carried out with ease from then on.

4 My eldest grandson is a computer whizz and is constantly modifying and updating his equipment. Once he was trying to install a cooling fan which was attached to the casing by locking rubber plugs inserted into drilled holes. There were four of these plugs and they had to be pulled into position, as like rope, you could not push them into place. Three were inserted and dragged through using long nose pliers. The fourth was a problem as there was no room to wield the pliers. My solution was to tie strong thread to the plug using a Highwayman's hitch. The thread was drawn through the last hole using a long thin wire loop and the plug positioned by hauling on the anchored section of the thread and then released by a tug on the other. Dick Turpin would have been proud.

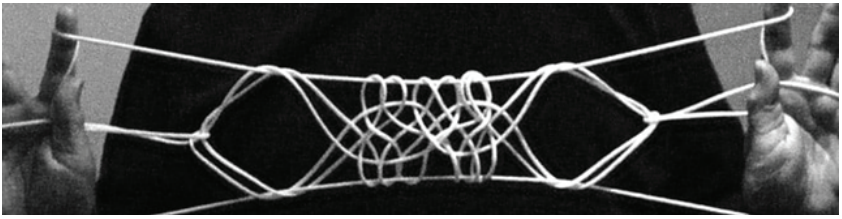
I have used my store of knot lore and rope-handling to mend an artist's easel high in mountain country, miles from a workshop. I have shortened a chain holding a heavy picture-frame that was not hanging true using string to draw the links together. Not all problems can be solved with knots and string, but a heck of a lot can.

* Icicle hitch

This hitch was developed by John Smith, an IGKT member from Surrey, England. He demonstrated the knot's capabilities at the 8th AGM at Fareham, Surrey in 1990 where he hung by this hitch from a splicing fid which was suspended pointing down from an anchor point in the ceiling. Ref: *The Hamlyn Book of Knots* by Geoffrey Budworth

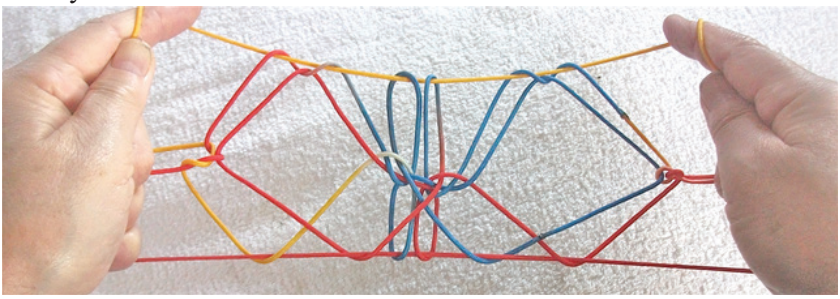
Knots That are Not

by Philip Noble



Following on from the article about Papua New Guinea (PNG) Bilum, I got to thinking it might be of interest to bring members of the IGKT up-to-date with the developments in string figure play and study over recent years.

It must be more than two decades ago that I wrote an article for *Knotting Matters* on the subject. So much has happened over recent years that an update is probably overdue.



The term string game usually applies to designs which can be constructed out of a closed unknotted loop, using the fingers, toes or other parts of the body.

These may frequently resemble ornamental knots but can always be returned to the single loop when the tension on the string is released.

In Europe, there has been some knowledge of these mainly in the form of the so-called 'cat's cradle', or other simple shapes, but as far as I can gather there is little evidence in art or literature of string figures in Europe before the 1750s.

However, worldwide, string figures have a much longer tradition and can be found in great number amongst many 'First Nation' peoples.

I became interested in string figures in 1972 while living in PNG, and began to learn how to make them. A few years later, I helped found the International String Figures Association (ISFA.org) along with Dr Hiroshi Noguchi who was a professor of maths of Waseda University in Tokyo.

The ISFA now has vast amounts of material on their web page and produces an annual bulletin of new material and research.

My original article in *KM* evoked a response from one reader living in France, story-teller Sam Yada Cannarozzi, and over the years we have become firm friends. Sam has performed a series of one-man shows all over the world. One of his pieces, called 'STRINGERIES' involves many different coloured loops being woven in an amazing continuous series of designs, and patterns, one after the other. It is a quite outstanding performance lasting 45 minutes or so.

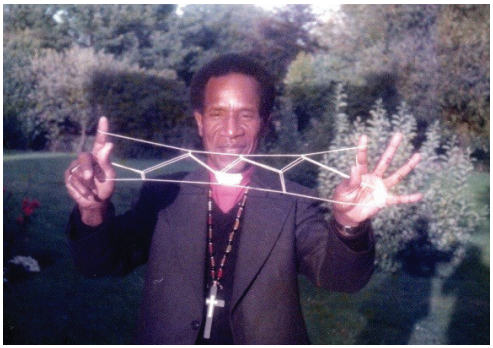
The 21st century has seen a renewed interest amongst mathematicians, ethnologists and anthropologists in string figures. I have had the joy and privilege of sharing in many events over the years, from schools, colleges and other institutions such as the Royal Anthropological Society and the School of African and Oriental Studies conference in London.

Dr Eric Vandendriessche of Diderot University in Paris heads up ETKnoS, a research project funded for four years by the French National Research Agency. The project is about Encoding and Transmitting Knowledge with a String: A comparative study of the cultural uses of mathematical practices in string-figure making (Oceania, North & South America). In 2018, Eric gathered a small number of ethnologists, mathematicians and string-game enthusiasts in Paris to compare notes on string figure research.

And the following year 2019, a much larger gathering with representatives from Australia, Papua New Guinea, South America, USA and Europe took place in Canberra to share insights into the topic. Even a professor of Artificial Intelligence was there. This year an online conference weekend on string figures was arranged by a group of enthusiasts in Chile, and I am presently helping a Brazilian enthusiast prepare a book on the subject in Portuguese.

A string game craze took off in Holland a couple of years ago, which involves presenting high quality YouTube video footage of the making of the string

figures by a company called ZtringZ who, along with these videos, sold the multicoloured string loops through various outlets.



So all is well and interest definitely growing again it this simple art form. I do realise that this is not strictly knotting but it is so closely related. Ashley includes some string loop tricks in his book, in chapter 33 on String Tricks and Puzzles. He refers to: a game called 'Cutting the Fingers' and clearly has some knowledge of string figures, as he mentions three early 20th century collections. 'Cutting the fingers' is also described by W.W. Rouse Ball, Kathleen Haddon and C.F. Jayne in their works on string figures."

String games have attracted the attention of other creative forms especially in larger versions, where people are used in place of fingers to form and extend the designs.

Oh, I forgot to mention that, in 2006, I was employed by Audi in Spain to design and train a group of actors to make giant string shapes, with a view to creating a string-game version of the Audi A4 for advertising purposes (You can view this on YouTube under the title: *Anuncio Audi A4 cuerdas*.)

And in 2008 I spent a week in Brussels with a dance company teaching them string figures as a preparation for a large new dance piece they were producing called *The Tent Project* (see YouTube/ Brussels string game.)

So I think it is well worth having a look at string figures for inspiration and for fun. If anyone wants more information I'd be happy to try to help.

Philip Noble
www.bubblestrings.com

Knots of Neolithic Fish-nets

by Martin Probert

Reproduced, with the permission of the author and editor from the
Bulletin of the International String Figure Association **Vol. 27, 1-3, 2020**

ABSTRACT

Neolithic fish-nets which have been found during excavation utilise one of three distinct ways of joining the separate cords of the mesh: the cord that is passed around the other is given either a simple knot, or a single twist, or a triple twist. The three types of join are illustrated by the linked strings in the centre of the following string figures.

A brief, excellent and finely-illustrated account of prehistoric fish-nets is to be found in *Prehistoric Europe*, J.G.D. Clark, 1952, pp. 226-7. A photograph of the earliest surviving fish-net, that from Antrea in Finland, is to be found in another book by the same author, *The Stone Age Hunters*, Grahame Clark, 1967, p. 98. Clark's source for his line drawings of fish-nets is *Geflechte und Gewebe der Steinzeit*, E. Vogt, 1937.

Join of Neolithic Knotted Fish-Net

Use a very short loop, or a doubled loop. *(see Editors' Note p 16)*

1. Opening A.
2. Release 5.
3. 1 from below removes 2 loop, keeping the loops on 1 separate.
4. 2 from above removes upper 1 loop.
5. L2 from below removes L1 loop, keeping the loops on L2 separate.
6. L1, from below through the lower L2 loop, removes from below the upper L2 loop.
7. Release 2.
8. 5 picks up 1f.
9. Extend to give Fig. 1. If necessary, pull ends of L1n-R1n to remove twist.

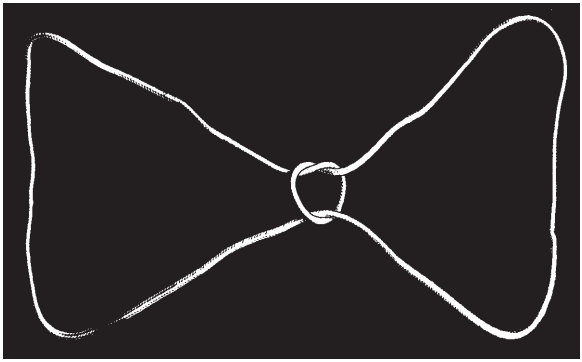


Fig. 1 - *Knotted Fish-Net*

Join of Neolithic Single-Twist Fish-Net

Use a very short loop, or a doubled loop.

1. Loop on 5.
2. L1 from above removes L5 loop.
3. L5, over L1f, picks up L1n.
4. R5, over L1n-L5n, hooks up L1f, R5 turning towards body and up.
5. Partly extend. Navajo R5 loops.
6. R1 into L1 loop from below.
7. Extend, taking care that the little loop that forms about L5n-R1f finishes up midway between the hands.
8. L5 from below removes L1 loop.
9. L1 picks up both L5n strings.
10. Extend to give Fig. 2. If necessary, pull ends of L1n-R1f to remove twist.

Fig. 2 - *Single-Twist Fish-Net*

Join of Neolithic Triple-Twist Fish-Net

Use a very short loop, or a doubled loop.

1. Form the Neolithic Single-Twist Fish-Net.
2. L2, over intermediate strings, hooks up L5f-R5f. Then with tip of L2 still pointing down, L2 picks up the other L5f string.
3. Release R5.
4. R5 picks up L2p.
5. Release L2.
6. Extend to give Fig. 3. If necessary, pull ends of L1n-R1f to remove twist.

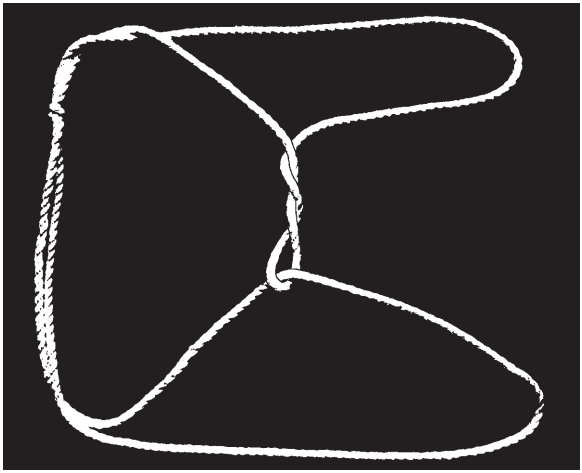


Fig. 3 - *Triple -Twist Fish-Net*

Editors' Note: We believe we are not alone amongst IGKT members in being unfamiliar with the notation used in the instructions given in the creation of these fish-nets. In 2020, Vol 27 pp 224-226 of the Bulletin of the International String Figure Association *included the following explanation under the heading* ***Nomenclature****:*

In recent years, many authors have adopted the abbreviated terminology introduced by D'Antoni (1994), this being a verbalized rendition of Storer's symbolic nomenclature (1988). Below is a summary.

D'Antoni, J. (1994) "Variation on Nauru Island Figures." *Bulletin of the International String Figure Association* 1:27-68. Pasadena, California: ISFA Press.

Storer, T. (1988) "String Figures." *Bulletin of String Figures Association,* No. 16, two-volume supplement. Tokyo: Nippon Ayatori Kyokai.

Abbreviations

1 = Thumb, 2 = Index, 3 = Middle, 4 = Ring, 5 = Little, H = hand

345 = Middle, ring and little fingers acting as a single finger.

L before designation = left; (i.e., L1 = left thumb)

R before designation = right; (i.e., RH = right hand)

n after finger designation = near; (i.e., 1n = near thumb string).

f after finger designation = far; (i.e., 5f = far little finger string).

p after finger designation = palmar; (i.e., 2p = string that crosses the palmar side of the index finger).

TV = transverse (a "straight across" string).

Explanations

When a string passes around a finger it forms a loop. Loops are named after the finger they surround (2 loop = loop on index finger of each hand): fig. 1.

Each loop has a near string (n) and a far string (f). The near string is the string closest to the thumb; the far string is the string closest to the little finger, regardless of how the hands are positioned: fig. 2.

A string that crosses the palm is a palmar string. A string that crosses the back of a finger or hand is a dorsal string.

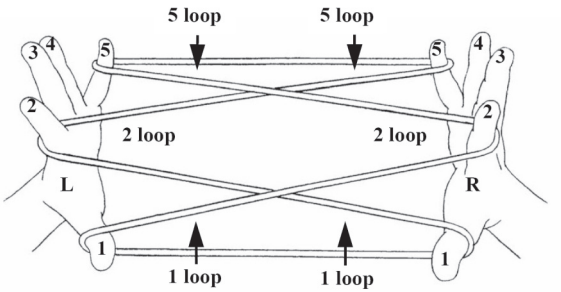


Fig. 1 – Opening A with fingers and loops labeled

A transverse string is a string that passes straight across the figure, often joining the same fingers on each hand.

In Opening A (fig. 2), the near thumb string (1n) and the far little finger string (5f) are both transverse strings. The other strings are oblique or diagonal strings (for example, L1f-R2n or R2f-L5n in fig. 2).

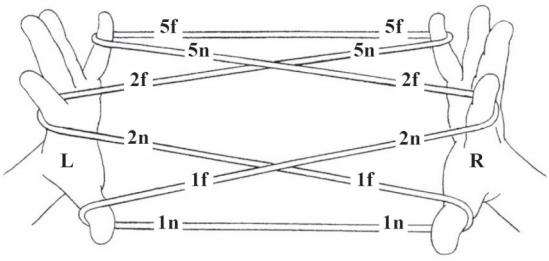


Fig. 2 – Opening A with strings labeled.

Loops can be entered from above (i.e., from the side nearest the fingertip) or below (from the side nearest the knuckle).

Given two loops on a finger, the loop nearest the fingertip is the upper loop; the loop nearest the knuckle is the lower loop, regardless of how the hands are positioned: fig. 3.

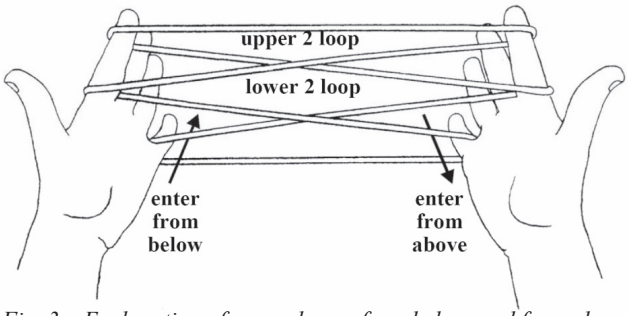


Fig. 3 – Explanation of upper, lower, from below, and from above.

Defined Actions

Pick up — Pass a finger under a string and use the nail side of that finger to retrieve the string.

Hook up — Pass a finger over a string and use the fingerprint side of that finger to retrieve the string; after catching the string straighten the finger by rotating it a half turn towards you or away from you as indicated.

Hook down — Pass a finger over a string and use the fingerprint side of that finger to retrieve the string; after catching the string press the tip of the finger against the palm, securing the string in the crook of the bent finger.

Transfer — Move a loop from one finger to another, inserting the finger as indicated (i.e., from above or from below).

Remove — Same meaning as transfer, but with emphasis placed on fingers rather than loops. Example: "2, from above, removes 1 loop" is the same as "Transfer 1 loop to 2, inserting 2 from above."

Exchange — Swap the loops encircling the same finger of each hand so that one loop passes through the other.

"Exchange 2 loops, inserting fingers from above, passing R loop through L loop" means transfer right index loop to left index, inserting left index from the fingertip side; insert right index into the lower left index loop (i.e., the loop nearest the knuckle), entering the loop from the fingertip side, then lift it over the upper left index loop and off the finger to complete the exchange.

Release — Allow the loop to slip off the finger.

Rotate — Introduce a twist in a loop by tracing out a circle with the tip of a finger. Loops can be rotated a full turn toward you or a full turn away from you using this method. To introduce a half twist, the loop must be temporarily removed from the finger and then replaced after the half twist is introduced.

Extend — Separate the hands to absorb slack. This is commonly done after loops have been released.

Navajo — Given two loops on a finger, lift the lower loop over the upper loop and release it, leaving only one loop (the upper loop) on the finger.

Common Openings and Endings

Position I — Place an untwisted loop on 1 and 5 of each hand; extend.

Opening A — Position I; R2 picks up L palmar string; L2, through R2 loop from above, picks up R palmar string.

Opening B — Same as Opening A, but L2 picks up R palmar string first.

Caroline Extension — 2 picks up 1f; as 2 returns, 1 presses firmly against the side of 2 to trap the short string that runs from 1 to 2 and the longer string that runs from 1 to 5. Extend with palms facing away. If desired, fold 345 down over 5f.

Important Note: For instructions written in D'Antoni nomenclature, perform all actions simultaneously *with both hands unless otherwise stated.*

Knots on Wood cont'd

by Vernon Hughes

A Ditty Bag with a Difference

How can you have a knot on wood in a ditty bag the reader may wonder. The answer lies in the design of the base of the bag.

Make-your-own ditty bags have been a popular theme with at least part of the Guild membership for a good while, and perhaps amongst devotees of *ABOK* in particular (see pp 576/7).

Down in the West Country Branch (UK), at least three of us got the bug at the same time some years ago. I knew that the white canvas that had been in the loft

would come in handy eventually, and now it was to see the light of day at last, and feel the needle. Fairly detailed instructions were available at the time which included an introduction to the discipline of creating a selvedge which sounded challenging. At the time I had visions of tying one of those fabulous accompanying lanyards that we see in *KM* from time to time, although even then there was a niggling doubt about practicality in use when the bag was free-standing and not hanging suspended in the rigging (of which there is a shortage in my inland home).

In considering dimensions and design, the idea for having a wooden base came to mind quite early, perhaps driven by fear of having to work two selvedged edges of canvas together, notwithstanding the efficiency of the special needle kit obtained from Des Pawson's retail stock at the time. Three particular design features of the circular, turned wooden base soon became clear.

The first was to have a means of protecting the hard cotton thread from abrasion when the bag was free standing and the second was to burn the Guild logo on the underside of the base to add character and a personal touch, and to fill an empty space. The third was to decide the number of holes to be drilled to achieve a snug fit, which ended up as 74.

The wooden base was 'dished' on the underside to restrict contact with flat surfaces to just the rim, thus protecting the pyrographed logo. And a recess was 'under-cut' around the rim of the base to keep the stitching out of contact with the standing surface. So that was that and once completed the bag was taken into immediate use but that matter of the lanyard still remained.

It was rather embarrassing to attend UK West Country Branch Meetings carrying the bag by gripping the upper rim, but so it went until I faced the fact that I badly needed the convenience of handles rather than a lanyard. As the photo shows, a first go at a simple pair of these is now in place, but the two spare eyelet holes are disconcerting. The aim now is to try to find the time to dream up and put in place a more stylish carrying system. Ideas welcome!

Jonathon Haines, one of the three mentioned above, felt the same need for handles and moved straight on from his ditty bag to make a white canvas hold-all bag as well. You could be sure that any type of bag that he devised would be stuffed to the gunwhales with knotting paraphernalia in next to no time.

Bark Canoes

by Frank Brown

There can be little doubt that the first water craft were convenient logs that could support the weight of a person while floating across a river. Then some genius tied two or more logs together and made a raft. There is no proof, but I feel confident that rafts were invented many times in different parts of the world as humans spread across the globe. In getting to Australia from the Asian mainland, the Australian aborigine's ancestors must have made substantial rafts, probably from bamboo, to cross many kilometres of ocean, as there was no land bridge, according to the geologists. The assumption that rafts were used has been tested and found to be possible with one being sailed from Timor to Australia a few decades ago. Such sea-going craft required strong ropes and secure knots, indicating a significant level of skill and experience.

Chopping down even small trees with a stone axe would be very hard work, while harvesting bark would be considerably easier. The Tasmanian Aborigines developed a raft resembling the reed craft of the natives of Lake Titicaca in some respects. They constructed three long cigar-shaped bundles of a suitable bark and lashed these together with bark rope. These craft were sufficiently seaworthy for people to visit nearby offshore islands, which again reflects the competency of the builders.

On the central island of the Australian archipelago, usually referred to as 'The Mainland', people developed a canoe made from a single piece of bark. These ingenious vessels were made by carving a bark sheet of about 4 x 1.5m from a standing tree. The sheet was shaped at each end and then carefully heated over a fire to enable it to be folded into the desired form.

There appear to be slightly different ways of shaping and securing the ends of the vessel in different areas of Australia, but essentially a rope made from bark was used.

In the Newcastle (Australia) museum there is a recently-constructed bark canoe made by aboriginal craftsmen, the whole process being videotaped.

Type “kuueeyung” into one of your search engines and you should be able to find the following video. A colleague kindly passed on a YouTube address that includes several videos from different areas on the subject. https://www.youtube.com/results?search_query=moogy%27s+canoe

One aspect of the demonstration of particular interest to me was the use of Gurkha kukris for removing the outer bark layers, a prime example of one culture benefiting another.

While the boat builders were busy, a group of mainly ladies was being shown how to spin up bark fibre to make what appeared to be a marlin type of cord by twisting the fibres with their fingers, not the rubbing on the thigh method. The product evidently went on to be made into a rope used later in the construction of the canoe.

Naturally, I was specifically interested in what knots were used in the building process. There was only one used as far as I could determine, the Thumb knot in the form of a Half Hitch and as a stopper. A wooden peg was driven through the bark near each end of the vessel and the rope attached using the Half Hitch and Stopper as shown.

The ends were then closed by lashing across the top of the bow and stern and finishing with a Half Hitch and Stopper.

Two wooden beams traversed the canoe sides to provide sufficient space for the occupant. I apologise for probably not using the proper terms for the construction. Gaps in the prow and stern were caulked with clay. The finished canoe is now on show as a special exhibit in the museum. Unfortunately, it was necessary to replace the bark rope with ordinary string, otherwise the craft is as it was completed and tested by the builders.

The demonstration of the canoe in use completes the video, showing that the vessel is rather ‘lively’ and has very little free-board. It is definitely a calm-water boat and I would be loath to use it if any crocodiles were known to be in the vicinity.

This type of craft could be seen as an example of the first actual boat, being radically different from a raft. It is easy to see how a craft of this type was modified by the addition of a wooden frame to make the birch bark canoe of North America. I assume the original idea for a bark canoe came when someone saw a curled piece of bark floating down a stream. All it took was a bit of ingenuity and a lot of hard work to create the craft.

My thanks to David Hampton, Curator (Collections Coordinator) and all the staff at Newcastle Museum, for assistance in gathering information for this article.

Trambling by Desmond Mandeville
Reviewed and Interpreted by Geoffrey Budworth
Pieter van de Griend

A synopsis of Pieter van de Griend's review appears later in this issue.

Introduction

A long time ago I was to submit a paper on *Invariants of knots & links*. The morning I did so, my eye spotted a typo on its opening page. Although the error must have been there for almost two years, it decided to defy my editorial-blindness and performed a desperate, last-ditch attempt, jumping right in my face. This was not just a random slip of the keyboard, but fundamental to the invariants I had lived with for so long.

Why am I telling you this? The same experience struck me when I started reading *Trambling by Desmond Mandeville - reviewed and interpreted by Geoffrey Budworth*. In its opening sentence, the reader is informed that a major transformative knot event occurred earlier than it really did [12]. So, by that tell-tale sign alone, I knew I was in for a great read!

Over time, the knot world has witnessed several game-changing events. People cannot stop talking about how Alexander the Great dramatically slashed the Gordian knot centuries ago. Clifford Ashley published his *magnum opus* and has kept knotters occupied to this day. Knots fascinate people. What makes our subject capable of capturing the greater public's attention? IGKT was conceived after *The Times* announced the Hunter bend, and many people, like Desmond, began reaching out to Geoffrey. I think there are multiple causes why knots get tied to people, and vice versa. The magical force driving Desmond's fascination, is surely among its principal powers. No doubt the trambling book began its journey through time in October 1978.

Where to position this work?

Trambling is a portmanteau word derived from *'tucking* and *rambles*. That game is quite simple. You are allowed to transform one knot into another knot by manipulating the elements of its structure, one tuck at a time, without it falling apart. This modest rule makes for a wonderful waste of leisure time as much as it makes for a great intellectual challenge. It depends on your own desire in which direction to turn. Let us venture down both paths and see where we end up. Taking both routes, I think, will position this book in a wider context allowing for a better appreciation of Desmond's and Geoffrey's efforts.

Introducing the rules – leisurely changing knots

Let us start simply. Knots have an intriguing property. As three-dimensional entities they project two-dimensional shadows. Those shadows allow a complete 3D-restoration, provided you know all crossing parities, that is the over-under configuration of the crossing points. Alternatively, if you have a shadow with n crossing points you can find 2^n potentially different knots. Already, in 1924, Shaw applied this idea to a collection of Reef knot and Carrick bend shadows [15, p 32].

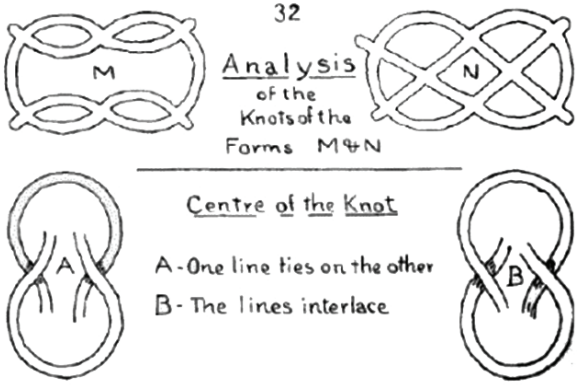


Fig 1 George Russel Shaw's structural analysis of bends (1924)

Ashley also sketchily documented an experiment, similar to Shaw's, on Carrick bend shadows [3, p 262, #1440]. Now, here things get interesting as Ashley opined elsewhere that a knot is either correct or hopelessly wrong [3, #77]. Getting a crossing wrong may be a *mortal sin*, but it could well lead you to a totally different type of knot. It may, in fact, lead you to an unrecorded structure!

It is obvious to state that knotted structures, realized in some pliable medium, allow deformation. Suppose you have one such simple knotted structure and modify it slightly, you remain in proximity to your starting point.

Keep that observation in mind and now watch how Ashley provides another, radically different, way of modifying knots.

One of them is brought as a humorous story on how a quayside bum gracefully transforms Two Half Hitches into a Bowline [3, #2549, #1782-83].

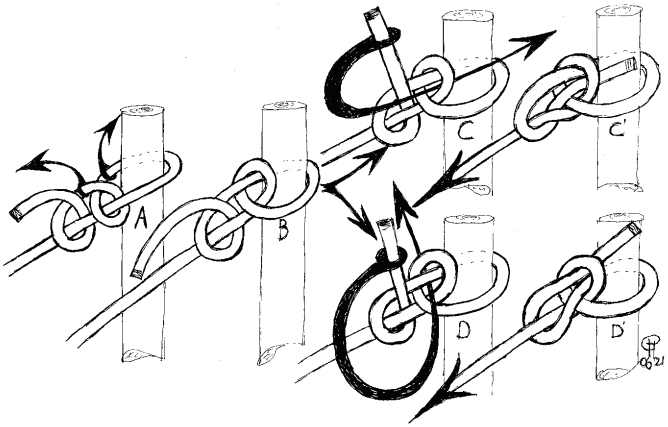


Fig 2 – Transforming Two Half Hitches to Bowline [#1782,#2549]

Whereas in 1924 Shaw still spoke about **changing structural aspects of bends**, he later extended his adventure to actual trambling (1933). Ashley's example spoke about **changing tying aspects of loop knots**. Charles Warner and I demonstrated how classes of closely related tying methods can be used to study hitches [18]. But we are not quite done, yet. One can also identify **changes of functional aspects between classes of knots**. Figure 3 shows how a simple tuck can transform a single-cord Reef knot into a Bowline. I call these three types of operations **proximities** [8,9].

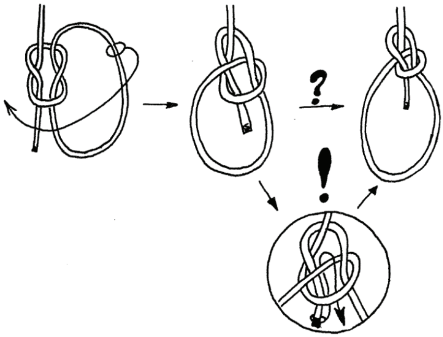


Fig 3- Transforming a bend to a loop knot

There is not really a definition for trambling, other than that you may tuck and ramble whilst reversibly changing a knot one move at a time. During the intermediate 'instable state' we expect the structure to be frozen, preventing it from falling apart.

From now on, we can skip the structural proximities as only the functional and tying proximities play a role in trambling, roughly distributed at 20% and 80% respectively. By progressively tucking the working end (**wend**) and/or the standing end (**stend**) in the structure at hand, Desmond discovered closed paths across sets of bends. Completing such a *'tucking ramble'* became known as a *tramble* [14].

After discovering his Basic Tramble, Desmond went on to find quite a few other tramble routes and from here his whimsical pastime became a notch more serious [5].

Introducing the tools – an intellectual challenge

Trambling is more than plain structural deformation. In the foregoing we viewed it as a game, but it can also be represented as a transition system. Such systems comprise a rule set and a state set. The former captures the permissible moves. The latter helps you know how you got to where you are at any point in the game. The state reflects the knotted structure at hand, but sadly there is no easy way to classify states. As said, the 2D projections contain all information needed and that is how Desmond started off. He simply drew his trambles by means of the respective knot diagrams. Together with Harry Asher, he scoured the literature for prior names to identify the knotted objects they were discovering [2]. He initially resorted to devising fanciful labels. That brings me to my only minor proposal, that I think would have benefitted the book. Extending Appendix One with diagrams next to the alphabetic overview of all used knot names would help knotters relying on structure rather than taxonomy.

The Basic Tramble discovery piqued Desmond's enthusiasm. But his desire to know more would no longer be a leisurely pursuit. He required two things. First, a symbolic shorthand instead of having to resort perpetually to re-drawing the diagrams to identify the objects in his research. The knot-names issue was circumvented by introducing letters, as figure 4 illustrates.

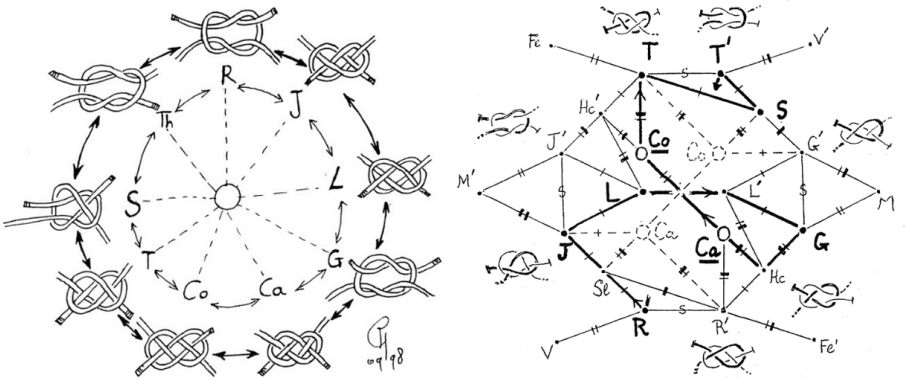


Figure 4 – Embedding the Basic Tramble (left) in a larger setting (right)

Second, Desmond was not only in search of something less demanding than diagrams. He was simultaneously seeking something more amenable to symbolic manipulation, preferably, while at it, describing the state transitions. He investigated whether topological knot theory could be applied to his subject. Although Wolfgang Haken (1962) proposed a normal form, which completely classified mathematical knots, it requires so much computational effort that his approach renders itself

impotent for any practical purpose [10]. Closest to transformations of the shuffling type, there remained three other candidates.

Kurt **Reidemeister** (1935) boils trambling moves down to their bedrock core [17]. Emil **Artin** (1947) approximates trambling by equipping the Braid Group with a set of generating moves [1]. Both approaches proposed operations that were designed to leave intrinsic geometric properties of the structure invariant, which is the constraint of topological knot theory. In that respect trambling is more realistically approached by the tangles introduced by John Horton **Conway** (1967). Unlike real-life bends, tangles are not subject to load, but do allow identification of wends and stends, while retaining topological invariance [6]. A large problem loomed on the horizon. As geometric amnesia is not allowed to occur in a mathematical knot, mathematicians fuse the ends of their knots. That action severely restricts trambling because mathematical knots have no ends to tuck and ramble. In short, trambling did not find solace in the known-knot theoretical world desperately seeking its holy grail of knot invariance.

Desmond, however, left nothing invariant during any of his expeditions along the bends. Even when only the tying proximity rule is obeyed, any trambler clearly is doing something different from what contemporary mathematical models can support. So, to know one's Bend Land position, do not expect support from the topological knot, braid, or tangle-theoretical domain. Ultimately, Desmond devised a home-brewed symbolic manipulation scheme to guide his excursions into Bend Territory. He named it a '**trambling cipher system**', encoding and decoding his trambling adventures.

Being able to denote the transitions symbolically, rather than pictorially, Desmond was in a better position now.

He could experiment systematically ensuring that completeness of his navigational framework could be demonstrated. The basic tramble provided the bare bones, suspending the canopy on which the trambling universe was painted.

This led him to the **tramble talisman** reflecting how close bends are when measured in terms of transformative moves.

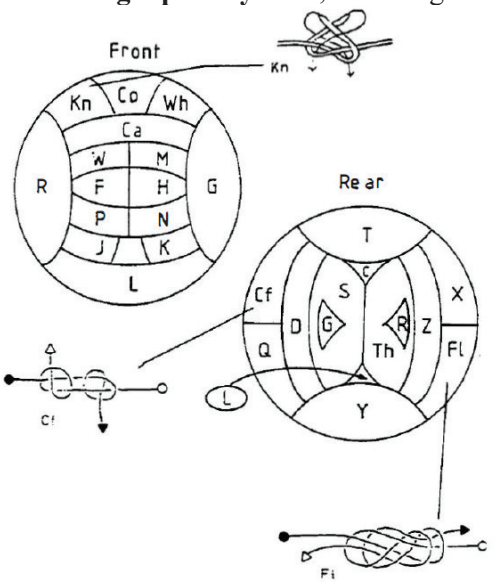


Figure 5 - The Tramble Talisman

The symbolic approach arrived with a new backbreaker, which Desmond tackled with intuitive elegance. As trambles quickly became harder to memorize, rhyming mnemonics helped and once again highlighted how trambles provide an interface between the frivolous and the formal.

What does this work bring us?

Is trambling a field worthy of study on its own merit? Will trambling studies into Bend Land ever drive academic research? Could it improve the understanding of dynamically interacting strings? Although knots in real life may tramble, it will be rare to witness a Zeppelin bend spontaneously morph into a Reef knot. It is still too early to tell, but I think trambling will add value in at least five domains.

Knot knowledge management

Knot knowledge management for knot practitioners is where I think the immediate value lies.

This book provides a comprehensive, yet detailed and relevant synopsis of a tough topic. It unites many original strands of thought and provides a perspective on a special class of knot properties.

Pursuing any quest into knots rewards the exploratory knotter by finding hitherto unrecorded structures. It is a formidable challenge to find any – or like Desmond's systematic approach did, to find many, during his quest for a Grand Unified Theory.

Mathematical research.

Some say that the way a system works reflects its logic. If you view trambling as a transition system, there is logic to knots. Mathematical research into knots, however, does not consider that kind of logic. The main approaches have been in the domain of topological invariance and for that reason have focussed on the study of entangled, closed loops containing knots.

On the one hand, there are recent developments that study aspects of mathematical knots, like volume and contact surfaces. On the other hand, there are also amphichiral studies, left untouched for over a century, that indicate how mathematics still struggles with the enigmatic nature of knots [11]. The original, real-life approach offered by trambling may well bust that deadlock for several reasons. The most prominent one, I think, is that an object known as the so-called 'homotopy group of a knot's complement', like any other mathematical group, reflects a form of symmetry.

The tramble talisman thus represents a fractional view of some group that hitherto has not enjoyed much research attention by the mathematical community.

Physics research.

Like mathematicians, physicists are attracted to patterns. Johannes Kepler explained how he thought the planets revolved around the sun along their 'perfect' tracks. Paul Dirac insisted that his approach to quantum mechanics was more of a geometric nature rather than an algebraic one [7]. Robbert Dijkgraaf and Michael Atiyah made waves in string theory that requires 26 dimensions to operationalize. Meanwhile Microsoft is chasing knot theorists to help them stabilize future quantum computers by better understanding topological quantum fields, like algebraic Hamming codes before them. All these things are heavily tied to knots – pun intended. The trambling talisman may well be just a shadow of what is really going on by reflecting wormholes and singularities in hyperspaces we do not yet understand.

Biological research.

Ever wondered how nature manages to knot and unknot proteins in DNA strands? The role of enzymes is a hot topic in protein-folding [13]. These chemical compounds emulate the role of trambling operations. Moreover, nature does not adhere to any self-imposed constraint of topological knot theory.

It is no bold statement to make that enzymatic manipulation is a trambling exercise in its own right. Furthermore, trambling does not support infinite randomness – the moves are constrained by the structure at hand. The transitions are deliberate, directed and do not allow the structure to disintegrate. If one candidate for trambling stands out, it must be the domain of protein-folding. Unfortunately, it will require a far more generic and formal approach than trambling currently offers.

Chemical research.

Chemists have a longstanding fascination with structure [16]. They have a natural affinity with thready, stringy molecular knots and enjoy speaking about chirality, handedness, and orientation. Concepts that show up during knot tying. Molecules surely are a magical medium in which to realize a knotted structure. Small surprise that Desmond Mandeville was a chemist?

In short, there is a surge of real-life knot studies across many of the formal knot-theoretical fields – but hardly any as pragmatic as the field of trambling.

Conclusion

A good story is important and interesting. It becomes great when it adds value. Desmond and Geoffrey pursued rigour, in terms of quality and depth, but also relevance in the knot knowledge context. The trambling subject is a highly original and intuitive approach to pragmatic knot theory and benefits any curious knotting mind. Do not take my word for it, or do not just flip pages of the book, rather do a tramble to find out for yourself.

The subject comes alive by immersing oneself in actual experience.

Trambling provides lots of new insights and avenues for discovery. Of course, I am biased, having known Desmond through our correspondence and having met him at his home. This is the kind of knot story that I devour because it is so thought-provoking and stimulating. It transcends the usual display of knots and teaches you deeply hidden knot properties. That, however, is not the only reason I love reading this kind of knot work. Thanks is due to Geoffrey for both his tenacity in completing the challenge and for doing such a great job in getting decades of Desmond's trambling notes into a format benefitting future researchers [4].

In closing, I would like to reach back to my opening typo. Exercising patience for *The Times* article to appear eight months later was certainly worth it. In this case the wait led to a fascinating book, propelling knot knowledge into taking a giant leap forward. As I said, I knew that that tell-tale typo carried the promise of a good read!

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Knots & Cords as Stores of Information

by Colin Byfleet

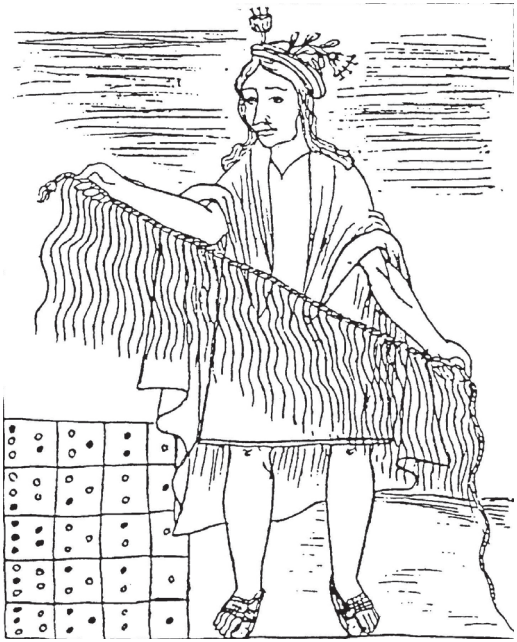
Inka Khipus[1]

Although data is scarce, it seems that the use of articles constructed from cords to hold information is an ancient tradition. There is evidence that such artefacts were current in the Andean region of South America for at least 1,400 years from about 600 AD onwards. The devices used (the khipus) were systematically sought out and destroyed by the Spanish invaders, for both military and religious reasons, when they took over this area. Khipus have been referred to in previous issues of *Knotting Matters* from the very beginning – see a quote in *KM* 1 (1982) from *Quipus and Witches' Knots* by Cyrus Lawrence Day; the use of two engravings for amusement in *KM* 5 (1983), followed by a review of Day's book in the same issue.

The store rooms of the Inca Topa Yupanqui. The picture shows the administrator giving an account of the stores to the Inca by means of his *quipu*.

From Poma de Ayala, *Nueva Corónica y Buen Gobierno* (1580–1620)

The Guild's Treasurer submits his accounts to the Auditor



The Treasurer subsequently presents his report to the annual general meeting

1 This name was often spelled "Inca Quipus". It has recently been changed by many to respect its origin as an Andean word, not one from the Spanish conquistadores. In some regions "kipu" would also be closer to the original. ("Khipu" is the Quecha word for 'knot')

KM 22 (1988) brought news of a manuscript newly translated into modern Spanish. Unfortunately, this provided no useful information about khipus. Since then, there have been no further accounts in *KM*, but research into South American history has been accumulating new sources and interpretations in the last 33 years. The writer hopes that this short review will set out some of the more important findings.

There are about 800 known khipus in museums, universities and private collections and many are available for study. There is currently a beautiful exhibition about khipus at the Museo de Arte de Lima (MALI), entitled *Khipus: Nuestra Historia En Nudos* (Khipus: Our History in Knots) which can be viewed online at https://mali.pe/portfolio-item/khipus/. By judicious use of a mouse, it is possible to read most of the explanatory panels (in Spanish and English) and view one enlightening video with English sub-titles.

Many of the known khipus carry information about numbers and were used for record-keeping, accounting etc. As can be seen from some of the images in this paper, khipus consist of a horizontal cord to which is attached a variety of shorter cords in various materials, directions of twist (S or Z), position on the top cord and mixtures of colours. The numerical information is conveyed by arrangements of simple or multiple Overhand knots: units at the bottom, then tens, hundreds, thousands etc, higher up. Zero is shown by an empty position, one by a Figure of eight knot or simple Overhand knot with higher units being conveyed by double, treble etc overhand knots, as shown below in this reconstructed khipu in the Lima exhibition

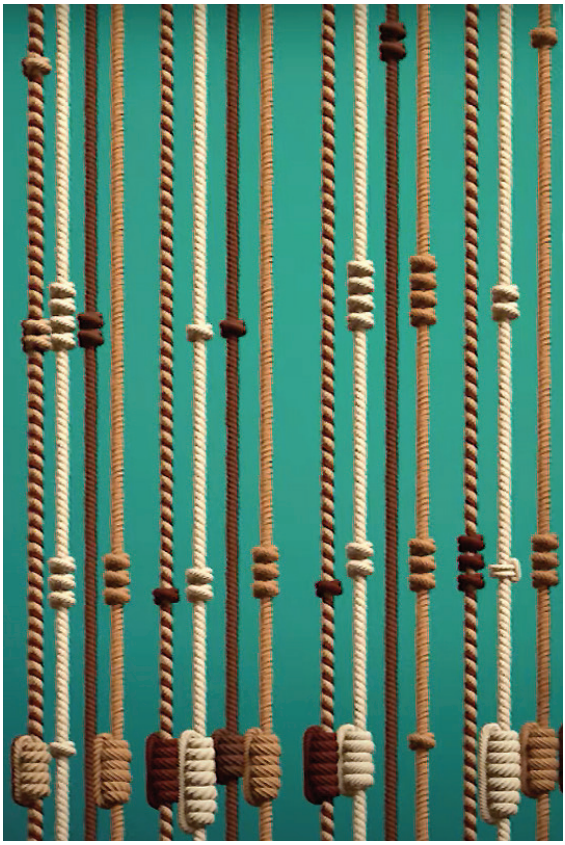
1 2 3 4 5 6 7 8 9

The figure overleaf shows a collection of numbers in khipu format. The left-hand cord has a fivefold Overhand knot at the bottom, with a space in the next row up, surmounted by a double Overhand knot in the hundreds row and a single Overhand in the thousands row. Reading from top to bottom, and representing this in our normal Arabic numerals, this cord represents 1,205.

Similarly, the second cord from the left reads 431.

The explanation of the other cords is left as an exercise for the reader. (Answers on p 45)

Whilst the numerical sections of khipus seem to have been interpreted successfully, other information contained in them has not.



It has become apparent that there is much to be learned of the meaning of the lay of the rope, the colour of the cord, the material(s) of the cord etc. There have been some useful pointers in the last decades. The first was a serendipitous find by Frank Salomon of the University of Iowa. In the Andean village of Tupicocha he was shown a collection of 11 khipus which were treasured by the extended family groups (‘ayllus’) in the village as an important part of their history. It would seem that the khipus recorded participation, perhaps of individuals, in co-operative efforts undertaken by the whole ‘ayllus’. This interpretation is not yet certain, there being no-one alive who can ‘interpret the cords.

In 2011, Sabine Hyland, of the University of St Andrews, studied a hybrid khipu/alphabetic (written) text from the village of Mangas in northern Peru. The boards show the names of people from the village and there are cords inserted through holes by the side of the names. The cord data - colour, direction of lay, ply, thickness, and number of threads - referred to the variables concerning each individual’s attendance and/or contributions to events. This was more than just a simple record: it showed who had not carried out their religious obligations. Those whose cords did not record attendance at catechism class were flogged. Christian kindness!

A more recent finding by Sabine has opened new doors and possibly a way of seeing that, as well as the ‘book-keeping’ records described above, there may be more to these artifacts than previously thought. Khipus having a more complex variety of cord-variables were shown to her in the tiny Andean village of Collata. She was the first person, apart from village elders, to have seen (and been encouraged to handle) these precious items.

The cords were made from the fur of six animals (vicuña, deer, alpaca, llama, guanaco, vizcacha) and were of different colours, diameters and mixtures.

These khipus were created as part of an anti-Spanish rebellion in 1783, and have about 95 distinctly different cords. This large number suggests that there are enough varieties of cord to support a very reasonable hypothesis that they indicate language in some way (logosyllabics in the jargon) as, for example, do Egyptian hieroglyphics.

This close-up of the detail of one of the Collata khipus shows the decorated ends of the main cord. The red deer-fur brush indicates that the subject of the khipu is about warfare on behalf of the Inka king. The Andean villages are often very remote, Collata and Tupicocha are at an altitude of 3,400m (nearly 11,000ft) and separated by about 60km (38 miles) in a straight line. To get between the two involves a descent to about 950m (3,000ft) and up again. The road distance is 133km (80 miles) and the journey time about 5½ hours on very twisty dirt roads.

That the Inka empire extended over at least 1,000 miles (N to S) of this terrain is quite amazing. Light khipus would have been relatively easy to carry over the unfriendly landscape and so provided a communication method for keeping their extended realm under control. We have much to learn about their systems.

My grateful thanks to Dr Hyland for her generous support in supplying research papers (and images) and for her encouragement.

Developing a Mat

by Manny Sardina

"Most people don't think like you", I hear my wife repeating herself, yet again. I take it as a compliment, in the way that anything said about anyone should be. I have always been an 'ideas' person although my day job does not reflect this. The knot world is a welcome escape to a creative land where the horizon just keeps growing.[1]

I have posted a few mats to the IGKT Facebook page, which I would encourage others to visit, if they have not already. Not as a participant in my personal festival of celebration, but to marvel at the wonderful examples of the work people produce. The creativity is one thing, but in addition to this is the medium used and then the final execution. We only see the result and not the hard work that goes into creating a single piece and the creators are only too pleased to share their knowledge. Teaching too is a gift and the learning that goes with this can be incredibly rewarding. When I finish a piece of ropework, I like to think "In the morning it wasn't, and now it is".

Designing mats can take many forms. *ABOK* is an obvious starting point with many designs that seem almost like doodles, and until they are made, do not seem to show their full potential in bringing such simple drawings into the real world. I design primarily for fun, to try and find patterns, shapes or whatever you want to call it, that would be aesthetically pleasing to the eye.

For this article, I want to take the reader on a journey through developing mats using the Carrick mat as the basis of all that will follow. The Carrick mat (*ABOK* #2287) is also a flat 3Lx4B TH and the symbol of the IGKT. When I look at a mat, I do so in different ways, sometimes looking at the loops and crossings in the cords and sometimes looking at the spaces between the cords, and always for its aesthetic appeal. The Carrick mat to me looks like:

i a square with the opposite diagonals joined by loops,

ii a square with a triangle on each side and then inverted triangles filing the gaps. It can be helpful in seeing mats in this way as expansions can be developed by changing the inverted triangle for a square, pentagon, hexagon, etc.

iii a 3-strand braid in a circle

iv a 3Lx4B TH

1 In order to tie any of the mats, larger images will be needed. We have saved these on A4 pages as PDFs on the website. On the following page, we have shown thumbnails of Development, Picure and Schematic drawings. For all the others we have only included a thumbnail Picture.

The list can be extended even further with the type of material, colours, spaces between the strands, the number of passes, and probably more.

Each of these ways of looking at the same mat can lead to different ideas of transforming the standard design into a new shape.

The ideas in this article are developed from the first point above, seeing the shape as a square with loops joining the opposite diagonals.

We will be progressively adding more mats to evolve new ones. At this point you might think that placing a few loosely tied mats into a washing machine on a relatively fast spin might give the same result. However, I must warn you that the final product would be somewhat random and difficult to duplicate.

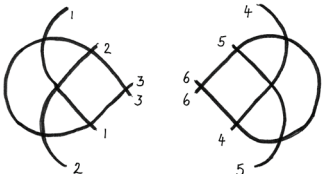
2 MATS

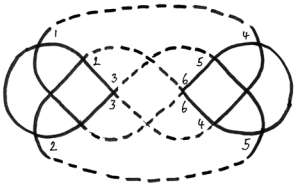
Let's begin with two. I sound like a nursery teacher. Stick with it, there's only a couple of pages. Placing the mats side by side, I have labelled the strands with the numbers from 1 to 6.

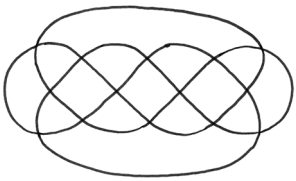
The aim of the game is to join all the numbers together into one long strand. Multi-strand mats can be created as well, but in this article, we shall be looking at the flatland of purist mats where one strand is plenty.

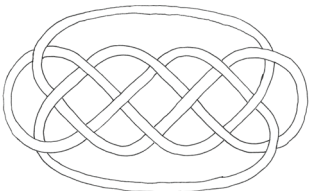
Joining the numbers in the sequence 1-6-2-5-3-4-1 gives us the familiar shape of the Ocean plait mat.

The sequence 1-4-3-5-2-6-1 gives the Thuro type mat below, which I have seen as an embellishment to a picture frame.









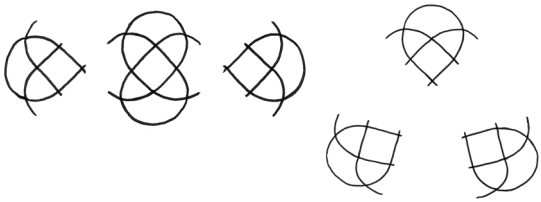
Thuro: Development, *Picture,* *Schematic*

3 MATS

Three mats can be placed either in a line or a triangular shape.

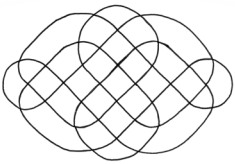
It is always good to give things names otherwise everything would be called …. thing.

This helps referencing the item in the future and so I have given names to the images below purely for the reference of the critics.

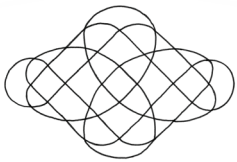


The three Carricks in a line can be developed as follows

"Bumblebee"

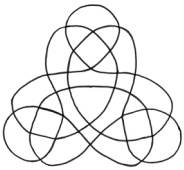


"Wasp"

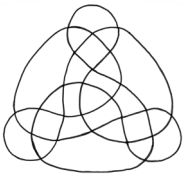


Here are some with three Carricks in a triangle

"Tristar"



"Wonky Wheel"

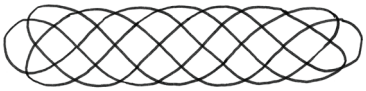


4 MATS

4 mats become a little more interesting and the results seem a little less contrived. These can be arranged in a line, as a cross or three in a line with one on top. It is possible to have an L shape, three in a line with a stack at one of the ends but for me this loses any symmetry.

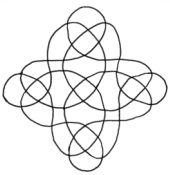
4 carrick mats in a line, or two ocean plait mats result in the 7-bight Prolong mat.

"Seven bight"

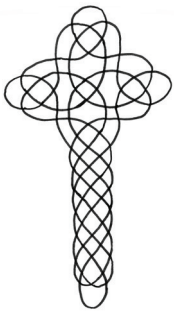


4 Carricks in a cross or square

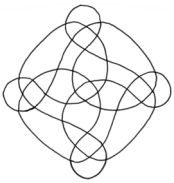
"Cross"



"Extended-Cross"



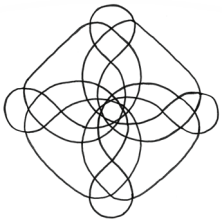
"Wonky Cartwheel"



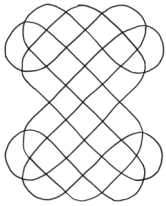
This expands the three Carrick Wonky Wheel into 4 Carricks and could be expanded even further, up to a "Wonky Ferris Wheel". A sense of fear and panic prevents me from creating a drawing for this, as I feel that I am rapidly approaching my threshold for danger and might easily pass out.

This next one created too many bights in the centre, so I turned it inside out through the middle, and produced something a little different.

"Pond"



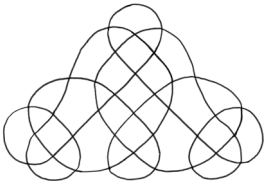
"Hourglass"



Another possibility is to combine mats of 2 Carricks vertically, for example the Ocean plait, to create the "Hour-Glass" by Kaj Lund.

4 Carricks in a triangle

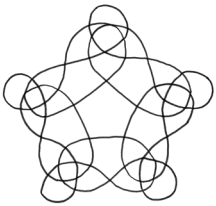
"Moth"



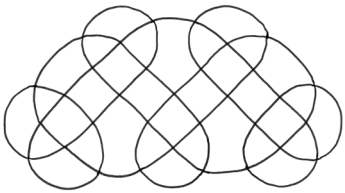
5 MATS

I find it strange to use squares to make a pentagonal shape, but here it is anyway.

"Morning Star"

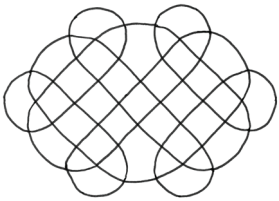


"Trapeze"



6 MATS

"Snowflake"



To sum up, this article follows the development of the bights and probably more accurate to say that it is development by duplication, repeating the basic shape and then joining the ends. Even though some of the above may seem an arduous task, I do this for fun, encouraged by the chance of finding something pleasing in the results. This is an example of one of the methods that I use, and I am sure that many of you will have your own as well. If you have made it this far in the article congratulations and, I hope you like it! I thank you for your attention and look forward to seeing your mat-making ideas very soon.

Editors' Note: ... and it doesn't stop at 6! Here's one he did earlier.

7 MATS "Radiance"

Tri-axial Lattices

by Europa Chang Dawson

The high humidity in some parts of China resulted in many rectangular structures, such as windows, becoming warped. This did not affect the windows themselves as, when panes existed,[1] they were sheets of paper painted with oil (often used cooking oil) to allow light into the rooms. However, the window frames were sometimes made hexagonal or octagonal to help maintain their shape, so there is a family of window-lattice knots.

Generally, the window-lattice Pan Chang knots would be fairly open, and crossings would be held in place with a few discreet stitches. If this was being used as a bezel, the stitches were made after the central piece had been inserted.

The pentagon design (right) has been tied by expanding the number of sides from 4 to 5 in the demonstration in *KM* 150. (NB The demonstration in *KM* 150 shows a rectangle in which the short sides have one reflex bendy-bight while the long sides have two. In the pentagon here, each side has only the one bendy-bight.) It is much easier to draw up the knot tidily if you begin with the outline of a regular pentagon when you are pinning out the cord – so that everything begins evenly spaced. When I tie this as a decorative knot, I wrap the scallops of the inner pentagon to hold the shape.

This design is easily extended to other polygons, and the homophonic associations are listed below so that you may choose the appropriate shape for your good wishes.

5 to have awareness/knowledge of
6 prosperity (language of Sichuan)
8 to flourish (Cantonese)
9 a long time-span, hence suitable for the elders
10 completion/fulfilment
7 is also used, specifically for craftsmen, as there is a phrase associating luck and deftness

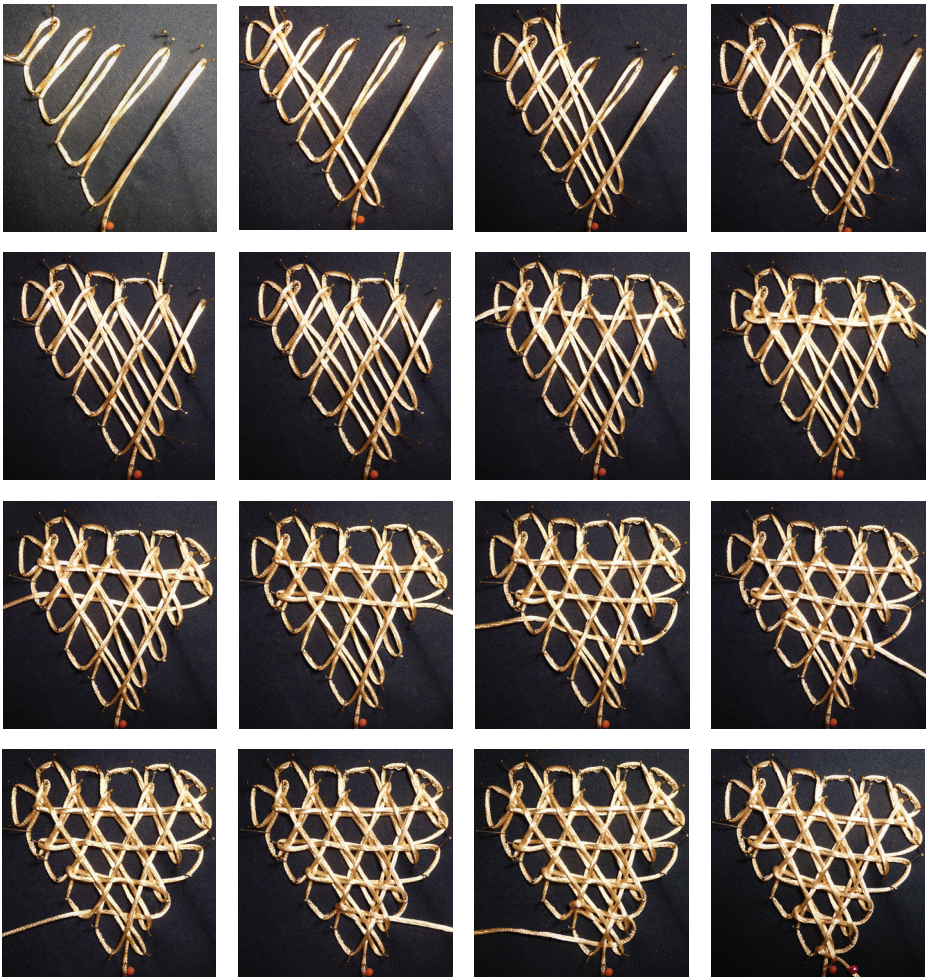
---

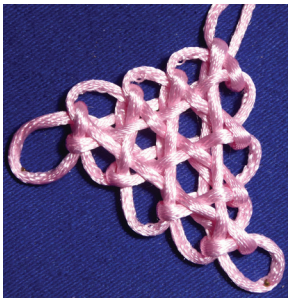
1 The panes were tacked on the frames at the beginning of the cold weather, and designs cut from red paper were pasted on the panes to provide a 'view'. These red papercuts could be purchased from stalls on street corners, but often families would make their own, with one elder narrating episodes of Chinese history or some famous tale while the rest of the family cut, or tied as well, the scenes. Even the youngest toddlers were involved, cutting 'boulders' or 'monsters' under adult supervision.

A more formally geometric lattice that is often tied is one I associate with the big baskets used for carrying bulky, but not particularly heavy, goods on the two ends of a yoke-pole. At Wesak, the festival celebrating the enlightenment of Buddha, baskets filled with hatchling chickens or pigeons were brought as temple offerings. (The monks or nuns would rear the birds and eat or sell the unfertilised eggs.) The baskets were woven from bamboo or rattan splints, and the holes were just the right size for a young child to poke a finger through and stroke the chicks.

The simple triaxial weave is demonstrated here,

Skip Pennock has designed a set of triangular flat knots, but the ones here have the Pan Chang structure with a double layer.

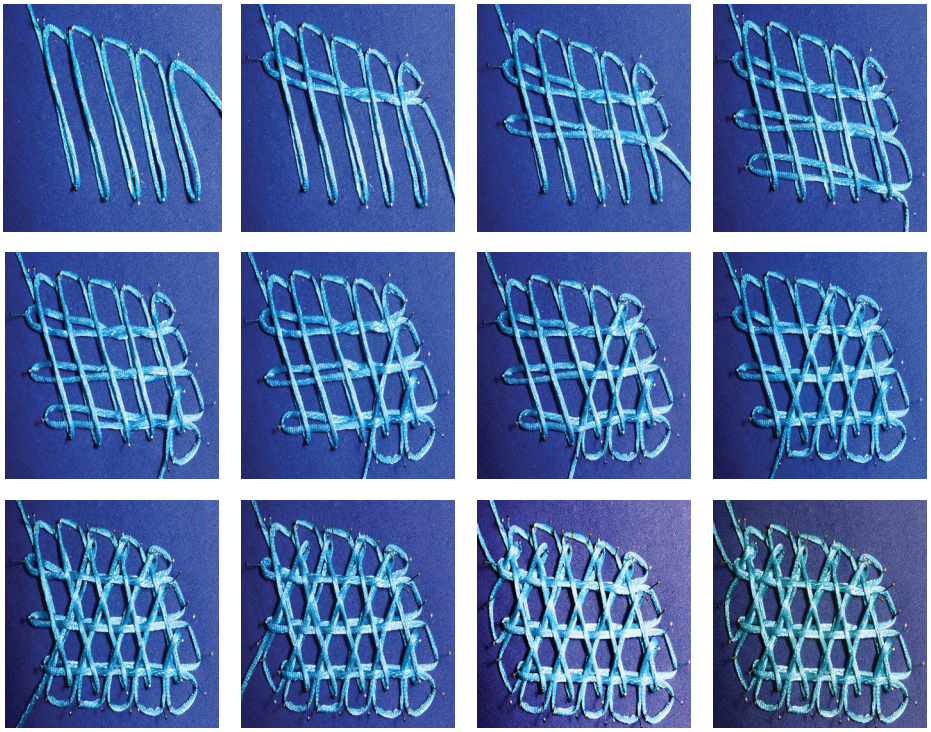




Note that in the third stage of the knot, the classical Pan Chang rule applies – the working end passes through the finger-bight, below the next finger-bight pair, through the next and so on, until it reaches the far side; then the wend returns by going over the finger-bight, through the next pair etc. I find it easiest to check after completing each double row at this stage, and it is much less painful than having to undo the lot.

For planning, your first set of finger-bights needs to have one more than the rows of cells.

The parallelogram is shown so that you can see how the structure can be kept in a shape built up from triangles. Remember that to maintain weave sequence the direction changes should be acute angles. If the knot is tied in a perfectly flat cord, or ribbon, the hexagonal form of the cells becomes much clearer, but the edge bights need stitching.



Editors' note: These images have been distorted slightly to show more detail

Toggle Rope

by Gordon Teenan

In days gone by, when warfare was a bit more 'hands on' as it were, a part of a commando's kit was a very useful and multipurpose device in the shape of a 6ft length of ⅝in manila, with about a 9in soft eye at one end, and a wooden toggle at the other, with a myriad of uses: linked together for a ladder, an impromptu bridge, whatever you can imagine. With a breaking strain getting on for about 1½ tons you could even suspend a military 4x4. I heard about these a long time ago and when I recently found a couple of toggles, I thought 'just the job, I'll make one, a 5-minute job, how hard can that be?' How many times have you said that? Having enough 'proper' rope (manila) I promptly set about it.

The soft eye is easy, a standard splice, its length will depend on the toggle dimensions and how easily you want it to go through the eye. Now for the toggle end. Even now, I'm not aware of any source explaining the form of the splice to use. The toggle has a groove in the middle, so I tied another eye splice and pushed it onto the toggle to lie in the groove. Not tight enough, might slip out, so try a smaller splice. But it seems that if the toggle will go through the splice, it cannot be tight enough around the groove. You might be forgiven for diving into *ABOK* to find a cunning splice, but remember, it wasn't around 'till 1944. The alternative is to actually splice round the groove itself. Still not tight enough. Could whip the throat but this would introduce another level of difficulty.

The answer seems to be to unlay the rope as per a normal splice, allow roughly 3in to go round groove and 9in for the actual splice, so seize the rope at about 12in, which allows 3in or so for pulling the last tucks tight and trimming back.

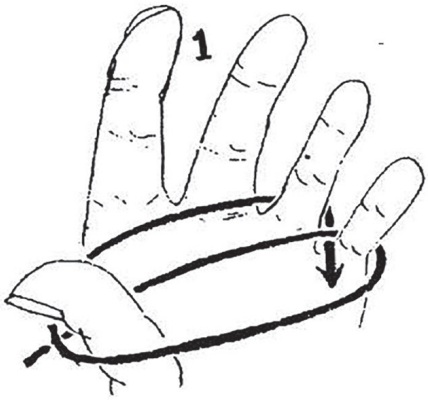
Then completely unlay each strand - here you run up against a property of tightly-laid natural rope: it tends to retain and spring back to its original lay.

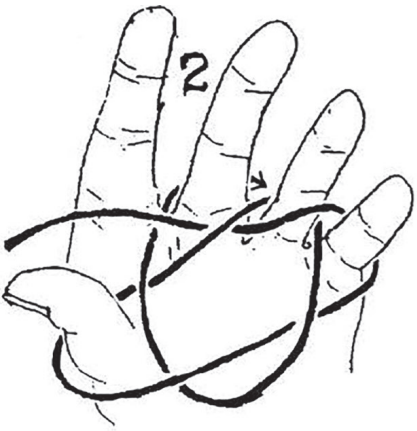
Lie each strand flat and snug in the groove and start splicing them into the standing part. Haul tight frequently until complete, and fair the splice as required

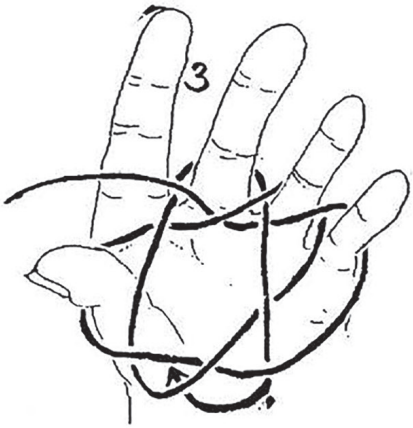
Some questions arise from this; was there any sort of reference work circulating in the Bristish forces? If the military had a requirement for something in rope, where would they turn? Did ropemakers have their own technical departments to deal with ‘requests’? The idea that all things ‘rope’ were traceable back to the navy at that time may not be true. Without an ‘original’ to hand, this is just one way that seems to work, and pleased I was to find it. I would be very grateful for other suggestions or methods.

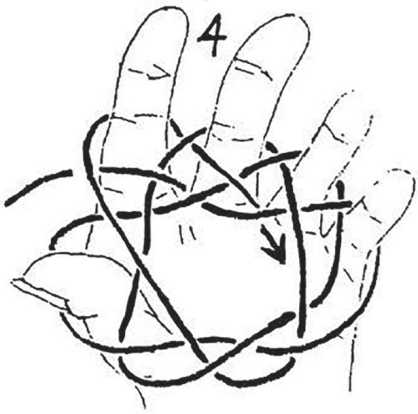
We would really like to hear from anyone who has any information!

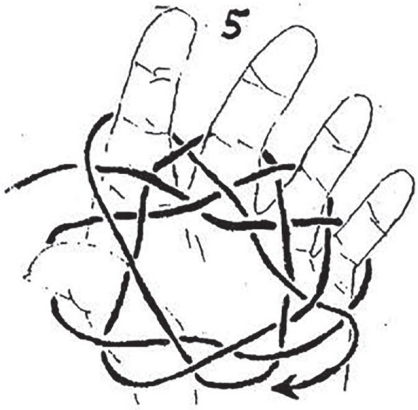
14Bx4L Möbius Turks Head

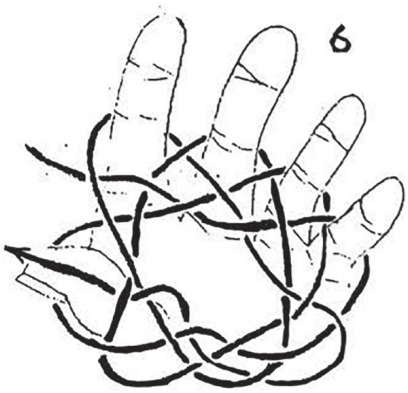












Publications Group

While discussing a reprint of *Charlie's Knots,* we found and corrected an error in the 7Bx5L Turks Head drawings*. We have now received word that a mistake has been found in the drawings for the 14Bx4L Möbius Turks Head, see left. So we have decided to turn to members for help.

If you can you see any mistakes in these sketches, or on any of the other pages of this very popular publication, please will you let us know where they are, and how they should be resolved via knottingmatters@igkt.net, so that we can correct them for the next printing.

*If you already have the book, our Supplies Secretary supplies@igkt.net can provide a pdf of the corrected drawings for the 7Bx5L Turks Head.

Book Review

Trambling by Desmond Mandeville Reviewed and Interpreted by Geoffrey Budworth Published by IGKT 2021

The word 'trambling' derives from a knotting pastime in which the knot tyer is said to be 'rambling' along a sequence of knots. You are allowed to change the structure at hand, one tuck at a time, but you are not allowed to let the construct fall apart. *Trambling by Desmond Mandeville* is a book that has been long in the making, but well worth the wait. Geoffrey Budworth reviewed and interpreted a considerable body of trambling notes that Desmond bequeathed us upon his passing away in 1992.

Several of Desmond's ideas were printed in *Knotting Matters*. But the backdrop, with the larger historical and evolutionary picture, lurked beyond the horizon, left in a state of unpublished manuscript. These notes deserved a push towards completion as well as presentation in a more comprehensive manner.

By gathering Desmond's legacy into one book, Geoffrey's work admirably accomplishes both objectives. He offers the reader a fascinating overview of how trambling came into existence and positions the subject in the context of other knot research. This highly original investigation hovers between formal and frivolous. Formally, it may well unleash new creativity in various scientific branches, where knots' invariant properties dominate a global understanding of their nature. Frivolously, it will aid any knotter in leisurely pursuit of the next knotty surprise along an exciting tramble. Pieter van de Griend

From p 31: *Numerical khipu answers (from left to right): 1205, 431, 36, 127, 104, 36, 16, 425, 2000, 431, 30, 217 & 1036.*

OBITUARY

Bob Bosch

October 24, 1933 – June 8, 2021

We are saddened to report that one of the Pacific Americas Branch's most stalwart and beloved members, Bob Bosch, of Eureka, California, passed away on June 8th 2021.

Born in Crescent City, California, Bob was a resident of Humboldt County for 80 years. He is survived by his wife, Sue, and his three daughters, Lisa, Lori and Karin and his sister Beverly. He was Grandpa (Pop) to Adam and two great-grandchildren, Joseph and Jaxson.

Bob served in the US Army and then worked at Emerson's Mill as a pond monkey. Pond Monkeys were men who hopped from log to log in a mill pond, guiding the floating logs into the intake for the sawmill, a job that required great strength and agility. He later became a mail carrier for the US Postal Service, and could remember the name of every person to whom he delivered mail throughout his career.

A romantic at heart, Bob loved knot tying and always had a length of string in his pocket, just in case a young or older person should ask. He also developed a great talent and love for woodworking, often accompanied by his daughter, Karin, who also loved being in his shop with him in his later years. His wife, Sue, to whom he was married in 1958, was the love of his life, his shining light. He made love knots for her, wrote her poems and arranged for releases of butterflies to express his great affection for her. Bob also studied and researched US lighthouses from the East to the West coast and spent much time at Point Arena and the Lighthouse Keepers housing.

We remember Bob for his great dedication to the Branch, having made several pieces for our knot collection, and for his ready smile and wit. Bob was always willing and able to help us at demonstrations and displays and continued to support us by contacting new members with a warm welcome packet. We will miss him greatly and we extend our thanks and condolences to his family for having encouraged and enabled him to be with us. Rest in peace, Bob; your work lives on in us all.

LP

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North American Branch - Mid-Atlantic Region - USA

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Pacific Americas - USA

www.igktpab.org/
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Tel: +(1) 1 310 871 8611
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All branch details as on IGKT website on 19/8/2021

BACK COVER: Extended Cross **see pp 34-38**

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A New System of Knotting by Harry Asher - A reprint. Asher's genius is shown really clearly	£7.00
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If you do not use e-mail, please contact the IGKT Supplies Secretary, address above